



Shirley Murillo researches hurricane winds



Shirley Murillo and Wen-Chau Lee examine a hurricane wind-circulation pattern at NCAR in 1998. (Photo by Carlye Calvin.)

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Highlights

When SOARS protégé Shirley Murillo was growing up in Miami, she was fascinated by hurricanes and tropical meteorology. She attended a special public high school that focused on earth science and math. During her senior year, she got an internship at the Hurricane Research Division (HRD) at the Atlantic Oceanographic and Meteorological Laboratory, which is part of the National Oceanic and Atmospheric Administration. "I enjoyed what I was doing so much that I worked extra hours," she said.

Shirley's fascination with hurricanes and work at HRD continues today. After high school, she followed the advice of her HRD colleagues and enrolled in Florida State University, majored in meteorology, and continued to work at HRD in the summers.

During her junior year at Florida State, Shirley heard about the SOARS program and applied. Her first SOARS project in 1997 had nothing to do with hurricanes. She studied the linkages between land surface and mesoscale models, with David Yates (NCAR) as her science research mentor.

For her second SOARS summer in 1998, Shirley was back on track with hurricane research, matched up with Wen-Chau Lee (NCAR) as her science research mentor. Wen-Chau and his colleagues had developed a technique called ground-based velocity track display (GBVTD) to deduce the primary circulation of hurricanes. Shirley's project involved implementing the GBVTD technique for nowcasting hurricane wind fields.

“During the landfall of Hurricane Earl in 1998, Wen-Chau and I ran the GBVTD technique for the first time in real-time at the National Hurricane Center in Miami. We gave the final analysis to the hurricane forecasters,” Shirley said.

Shirley completed her undergraduate degree in meteorology in 1999 and returned to SOARS for a third summer. She continued working with Wen-Chau and the GBVTD technique, applying the technique to the radar data from Hurricane Danny, which occurred in 1997.

After two more years at HRD, Shirley entered graduate school in meteorology at the University of Hawaii at Manoa. On her way back from Hawaii after the spring 2002 semester, she stopped by Boulder, Colorado, to give a workshop and lab on tropical cyclone evolution following landfall. Her presentation was part of a COMET course for science operation officers from the National Weather Service.

Shirley’s talk focused on using H-Wind, hurricane wind analysis software that brings wind data from a variety of platforms into one picture. Meteorologists use the output from H-Wind to look at the different wind measurements around the hurricane and determine the wind fields. Shirley became knowledgeable on using the H-Wind software as part of her ongoing work at HRD.

Shirley’s master’s thesis is an extension of her SOARS research using the GBVTD technique and her work using the H-Wind software at HRD. Wen-Chau is on her advisory committee.

“I’m trying to incorporate the radar data and the analysis I get from GBVTD into the surface-wind analysis from H-Wind,” she explained. The surface-wind technique works well for analyzing the surrounding environment, but commonly misses information from the hurricane core. The radar observations are very good at resolving the core structure. Shirley’s work will be trying to fit everything into one package.

“I’ve seen Shirley grow from an undergraduate student,” said Wen-Chau. “It’s a very satisfying feeling to see a young person grow in a professional career. I think that’s what SOARS is all about.

“SOARS is an excellent opportunity to introduce young scientists to the field and let them see how we work,” he said. “We can give them some exciting projects and get them fired up. In return, the scientists get some data analyzed.”

During hurricane season, Shirley may not make much progress on her thesis. “I have to drop everything and worry about what’s happening right now. I do the surface-wind analysis,” she said.

“When the planes are flying into the storm, we’re collecting the flight-level data from them. Through several algorithms, we use the flight-level data to produce a surface-wind analysis, which we pass on to the specialists at the National Hurricane Center.”

The surface-wind analysis is crucial information for forecasters to decide where to issue hurricane warnings and watches. HRD does the research; the National Hurricane Center does the forecasting, Shirley explained. After the hurricane season, Shirley will have more time to concentrate on her thesis, which she hopes to complete in 2003.